Chemistry Group Overview

	Unit Name	Atoms and Periodicity	Properties and Bonding	Reactions and Stoichiometry	Gases and Thermochemistry	Kinetics and Equilibrium	Solutions and Acids/Bases
	Time Frame	6 weeks	6 weeks	9 weeks (S1 - 6 weeks)(S2 - 3 weeks)	5 weeks	3 weeks	6 weeks
Course Name: Chemistry	**Standards**	SC1. a, b, c, d, e, f, g	SC2. a, b, c, d, e, f	SC3. a, b, c, d, e	SC2. g SC5. a, b, c	SC4. a, b, c, d	SC6. a, b, c, d, e, f, g, h
	Science and Engineering Practices	**SEPs** ● Obtain, evaluate, & communicate information ● Construct explanations and design solutions ● Engage in argument from evidence ● Develop and use models	**SEPs** ● Obtain, evaluate, & communicate information ● Ask questions and define problems ● Develop and use models ● Plan and carry out investigations ● Construct explanations and design solutions ● Engage in argument from evidence	**SEPs** ● Obtain, evaluate, & communicate information ● Plan and carry out investigations ● Use mathematics and computational thinking	**SEPs** ● Obtain, evaluate, & communicate information ● Develop and use models ● Plan and carry out investigations ● Use mathematics and computational thinking ● Construct explanations and design solutions	**SEPs** ● Obtain, evaluate, & communicate information ● Plan and carry out investigations ● Construct explanations and design solutions ● Engage in argument from evidence ● Analyze and interpret data	**SEPs** ● Obtain, evaluate, & communicate information ● Ask questions and define problems ● Develop and use models ● Plan and carry out investigations ● Use mathematics and computational thinking
	Approaches To Learning	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills	**ATL** ● Communication skills ● Social skills ● Self Management skills ● Research skills ● Thinking skills
	Statement of Inquiry	**Statement of Inquiry** All substances are composed of tiny, discrete particles that interact to shape the properties and behavior of materials in the world around us.	**Statement of Inquiry** Attractive forces exist between atoms, ions, and molecules and govern the structure, properties, and reactivity of matter.	**Statement of Inquiry** Mass is preserved in chemical reactions and provides a tool to predict and understand the quantity of reactants and products in a given reaction.	**Statement of Inquiry** Chemical reactions are governed by the energy changes and feasibility of the reactions.	**Statement of Inquiry** Chemical reactions are governed by the factors that influence the speed and outcome of diverse chemical transformations.	**Statement of Inquiry** A dynamic exchange of solute and solvent particles exists within aqueous solutions, leading to the establishment of chemical equilibrium and influencing crucial properties like pH levels.

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	Pheno-menon	**Phenomenon** Semiconductors are vital components in modern technology, playing crucial roles in a wide array of electronic devices and systems such as microprocessors, Wi-Fi routers, and mobile phones OR Nanotechnology involves manipulating matter at the atomic and molecular levels to create materials with novel properties and applications.	**Phenomenon** Hydrophobic coatings, such as Rain-X repel water while preserving the natural behavior of raindrops, creating visually striking and impermanent artworks that become visible during rain events and disappear when the pavement dries. OR Water purification and desalination are essential for providing clean drinking water, especially in areas with limited freshwater resources.	**Phenomenon** Airbags utilize the chemical decomposition of sodium azide (NaN_3) which breaks down into elemental sodium (Na) and nitrogen gas (N_2). Using the correct amount of sodium azide is important so that the airbag inflates to the correct volume due to the production of the correct volume of nitrogen gas which can be calculated using stoichiometry. OR In baking, precise measurement of ingredients is crucial. By understanding that matter is conserved, bakers ensure that all ingredients (matter) are accounted for, leading to consistent results.	**Phenomenon** Mood rings change color based on the temperature of the wearer's skin, which reflects changes in their body temperature, influenced by their emotional state. These color changes are a direct result of the behavior of liquid crystals in response to temperature variations. OR Neon signs emit light due to the excitation of neon gas atoms by an electric current. The light emitted is a result of the energy transitions of electrons within the neon atoms, as explained by the Kinetic Molecular Theory.	**Phenomenon** Traditional hand warmers utilize the exothermic reaction between iron and oxygen to create iron oxide which can be sped up by increasing the concentration of oxygen present. OR Rechargeable batteries are crucial for powering modern electronic devices, from smartphones to electric vehicles. Improving their design involves understanding and manipulating the chemical reactions within the battery, as well as optimizing various engineering factors.	**Phenomenon** The pH of seawater is decreasing due to increased carbon dioxide absorption by the oceans, negatively impacting marine ecosystems, coral reefs, and marine life with potential far-reaching consequences on biodiversity and global food chains. OR When engaging in vigorous physical activity the body produces lactic acid which is neutralized by the body through various chemical processes.
	Global Context	**Global Context** Globalization and Sustainability	**Global Context** Scientific and Technical Innovation	**Global Context** Globalization and Sustainability	**Global Context** Scientific and Technical Innovation	**Global Context** Globalization and Sustainability	**Global Context** Fairness and Development
	Key Concepts	**Key Concept(s)** ● Systems ● Relationships **CCCs** ● Systems and System Models ● Structure and Function ● Patterns ● Energy and Matter	**Key Concept(s)** ● Relationships **CCCs** ● Structure and Function ● Stability and Change ● Patterns ● Energy and Matter ● Systems and System Models	**Key Concept(s)** ● Systems ● Change **CCCs** ● Systems and System Models ● Stability and Change ● Scale, Proportion, and Quantity	**Key Concept(s)** ● Systems ● Change **CCCs** ● Systems and System Models ● Stability and Change ● Scale, Proportion, and Quantity	**Key Concept(s)** ● Systems ● Change **CCCs** ● Systems and System Models ● Energy and Matter ● Stability and Change ● Cause and Effect	**Key Concept(s)** ● Systems **CCCs** ● Systems and System Models ● Patterns ● Stability and Change ● Cause and Effect

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				● Cause and Effect		
Related Concepts	**Related Concept(s)** ● Models ● Evidence ● Patterns	**Related Concept(s)** ● Patterns ● Form ● Consequences ● Interaction	**Related Concept(s)** ● Models ● Balance ● Interaction ● Transfer	**Related Concept(s)** ● Models ● Evidence ● Consequences	**Related Concept(s)** ● Models ● Energy ● Movement ● Function ● Conditions ● Evidence ● Consequences ● Transfer	**Related Concept(s)** ● Models ● Movement ● Interaction ● Conditions ● Function
Design Cycle Trans-disciplinary	**CORE IDEAS** ● Element Formation ● Nuclear Fusion ● Models of the Atom ● Billiard Ball ● Plum Pudding ● Nuclear ● Bohr ● Quantum ● Element Identity ● Subatomic Particles ● Proton ● Neutron ● Electron ● Isotopes ● Isotopic Abundance ● Ions ● Electron Arrangement ● Orbital Notation ● Electron Configuration ● Full and Abbreviated ● Lewis Dot Diagram ● Light Emission ● Periodicity / Properties ● Atomic Mass ● Atomic Radii ● Ionization Energy ● Electronegativity	**CORE IDEAS** ● Materials ● Intramolecular Forces ● Metallic Bonding ● Electron Sea Model ● Ionic Bonding ● Types of Ions ● Crystal Lattice ● Nomenclature ● Chemical Formulas ● Polyatomic Ions ● Intermolecular Forces ● Covalent Bonding ● Lewis Structure ● Nomenclature (including acids/bases) ● Chemical Formulas ● Polarity ● Physical and Chemical Properties ● Electrical Conductivity	**CORE IDEAS** ● Chemical Reactions ● Parts of a Chemical Reaction ● Indicators of a Reaction ● Types of Reactions ● Synthesis ● Decomposition ● Single Replacement ● Double Replacement ● Combustion ● Chemical Equations ● Law of Conservation ● Balancing Equations ● Reaction Stoichiometry ● Limiting Reactants ● Excess Reactant ● Mole Conversions ● Moles to Moles ● Mass to Moles ● Moles to Mass ● Mass to Mass ● Molar Volume ● Mole Ratio ● Percent Yield ● Percent Composition ● Empirical Formulas ● Molecular Formulas ● Significant Figures	**CORE IDEAS** ● Gas Laws ● Pressure ● Ideal Gas Law ● Combined Gas Law ● Boyle's Law ● Charles' Law ● Molar Volumes of Gases ● Heat (formation, vaporization, fusion) ● Specific Heat ● Enthalpy ● Heat Change ● Hess' Law ● Phase Changes ● Heating Curves ● Energy ● Calorie and Calorimetry ● Joule ● Endothermic ● Exothermic	**CORE IDEAS** ● Energy ● Collision Theory ● Transition State Theory ● Activation Energy ● Reaction coordinate diagram ● Reaction Rates ● Forward Reaction ● Reverse Reaction ● Changing Reaction Rates ● Catalysts ● Concentration ● Temperature ● Pressure ● Equilibrium ● LeChatelier's Principle	**CORE IDEAS** ● Solutions ● Parts of a Solution ● Solvation ● Dissociation ● Rate of Dissolving ● Concentration / Saturation ● Molarity ● Percent by Mass ● Dilution ● Saturated, unsaturated, supersaturated solutions ● Solution Preparation and Proper Labeling ● Colligative Properties ● Boiling Point Elevation ● Freezing Point Depression ● Acids and Bases ● H_3O^+ Concentration ● pH ● Arrhenius Model ● Bronsted-Lowry Model ● Neutralization ● Equivalence Point ● Titration ● Indicator ● End point

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		● Reactivity					
	MYP Assessments/ Performance Tasks	● Unit 1 Common Formative Assessment(s) ● Unit 1 Common Summative Assessment(s) ● MYP Criterion A, B, C, D	● Unit 2 Common Formative Assessment(s) ● Unit 2 Common Summative Assessment(s) ● MYP Criterion A, B, C	● Unit 3 Common Formative Assessment(s) ● Unit 3 Common Summative Assessment(s) ● MYP Criterion A, B, C	● Unit 4 Common Formative Assessment(s) ● Unit 4 Common Summative Assessment(s) ● MYP Criterion A, B, C	● Unit 5 Common Formative Assessment(s) ● Unit 5 Common Summative Assessment(s) ● MYP Criterion A, B, C	● Unit 6 Common Formative Assessment(s) ● Unit 6 Common Summative Assessment(s) ● MYP Criterion A, B, C, D
	Differentiation For Tiered Learners	Marietta City Schools teachers provide specific differentiation of learning experiences for all students. Details for differentiation for learning experiences are included on the district unit planners.					
Course Levels		**Marietta City Schools offers Honors, and IB classes to provide differentiated learning experiences for students.**					